4.13 Operating Unit

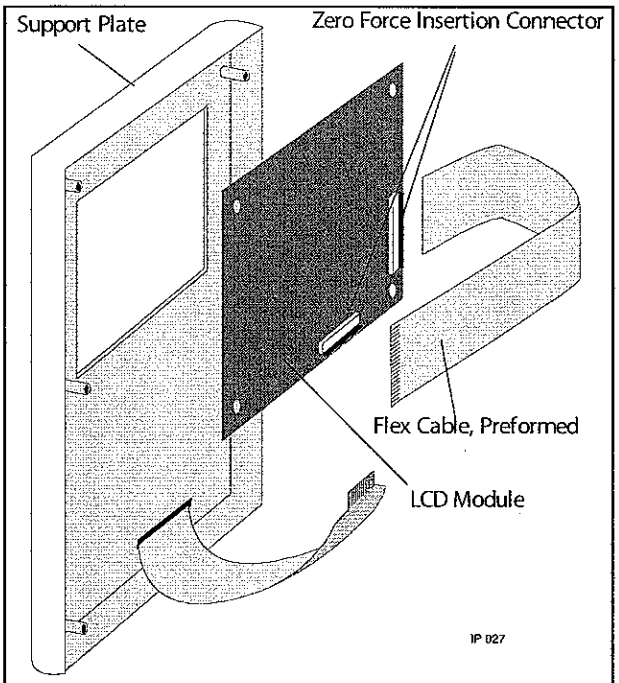

Fig.: 4 - 17

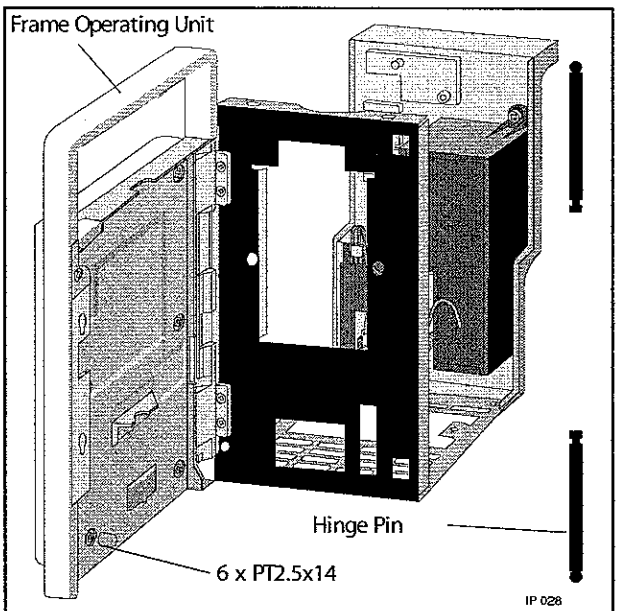

Fig.: 4 - 18

Designation	Ord. No.
Membrane keypad with support plate and seal	3452 0635
LCD module	3450 1819
Flex cable, preformed	3450 8830
Frame incl. pressure spring and magnet	3450 1835
Flexible cable 42 mm (5 pcs.)	3477 3347
Hinge unit	3450 5571
Hinge pin (3 mm)	3450 5580
Magnet	3450 5849

Exchange

Tools: Screw driver Torx T6

1. Remove battery (see "Battery" pg. 4-1).
2. Disassemble the door lock.
3. Loosen countersunk screw and bridge.
4. Remove tamper-proof caps (6 pieces) on the door frame by piercing a screwdriver through the caps to loosen the countersunk screws.
5. Unlatch the zero force insertion connector and loosen the flex cable.

Note

The position of the flex cable must not be changed, i.e. the preformed section must be in the hinge area (pivot). Mark the cable, if necessary.

6. Disassemble either LCD module or support plate with membrane keypad or door hinge pins respectively and exchange the door frame.
7. Assembly is done in reverse order. Pay attention to the correct direction of the door hinge pin during assembly.

Note

Do not kink either of the flex cables. Push the contacts to the stop of the zero force insertion connector and lock in same position.

Check

Electrical safety, functional check, pump unit check.

4.14 Barcode Label

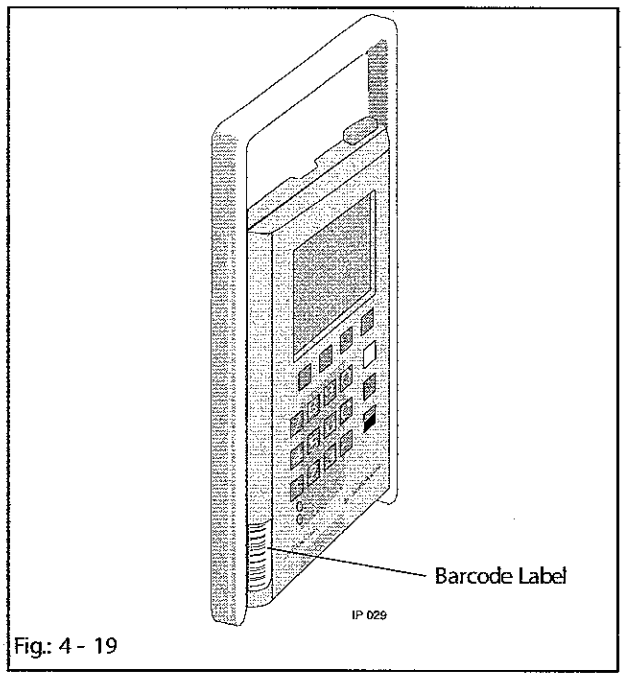

Fig.: 4 - 19

Designation	Ord. No.
Barcode label (see "Order Form" pg. A-2)	3450 9070

Exchange

1. Remove old barcode label, if existing.
2. Clean the adhesion surface with an alcoholic cleaning agent and let dry.
3. Loosen barcode label from the base material and stick it on.

Note

Destroy the type plate delivered.

Check

Check that serial number and pump symbol in the plain text field of the barcode label correspond with the type plate on the pump of the Vista basic.

4.15 Frame with Seal

Designation	Ord. No.
Frame with seal plate	3450 1770

Exchange

1. Disassemble all parts as described before and exchange the frame with seal plate.

Check

Electrical safety, functional check, pump unit check.

For your notes:

Checks after Repair 5

Depending on the work carried out, perform the relevant check blocks (1., 2., 3 and / or 4.).

1. Visual Inspection	2. Safety Inspection As per IEC/EN 60 601-1	3. Functional Inspection	4. Pump Unit Inspection
❒ OK after visual inspection	❒ Mains voltage ____ V AC ❒ Protective conductor resistance incl. mains cable < 0.2Ω ____ Ω ❒ Insulation resistance >> 2 MΩ ____ Ω ❒ Earth leakage current ≤ 30 µA ____ µA	Switch on Unit: ❒ Self-test ❒ Control lamps Compare with Display: ❒ Set delivery rate Battery Test: ❒ Switch mains/battery/ mains ❒ Switch on in battery mode and check self-test Air Sensor: ❒ 0.4 ml air bubbles alarm ❒ Air value ❒ Water value ❒ Calibration value (alarm threshold), adjust if necessary Values see TSI Drop Sensor: ❒ Simulate occlusion alarm (alarm with closed roller clamp) ❒ Simulate free flow (alarm) ❒ Staff call ❒ Alarm suppression	Room Temperature 20-28° C Electronic Occlusion Pressure: ❒ Check alarm with switch-off pressure low / high ❒ Zero value setting Service program function 500.0 Mechanical Occlusion Pressure ❒ Flow inhibitor Pressure check = 11.6 PSI no free flow ❒ Delivery accuracy

Observe the procedure information (see "Procedural Instructions for Inspection", pg. 8 - 1)!

Checks after Repair

For your notes:

Maintenance 6

It is recommended every 2 years. In addition to the technical safety inspection, perform the following inspection points:

1. Check the rubber feet and if necessary exchange.
2. Check easy running of the pump cover, lock mechanism and door.
3. Check easy running of the flow inhibitor, clean and if necessary exchange pressure springs.
4. Check seal membrane and if necessary exchange.
5. Check the drop sensor optic and spring mechanics and clean, if necessary.
6. Open unit. Internal visual inspection. Clean the seal surfaces and if necessary exchange seal strip.
7. Check mechanical occlusion pressure and if necessary calibrate.
8. Check electronic occlusion pressure and if necessary calibrate (see "Occlusion Sensor" pg. 4-14).
9. Assemble and seal unit ready for operation.

Maintenance

For your notes:

Technical Safety Inspection TSI

Index d

(Master - to be added to the documentation)

Checklist for Technical Safety Inspection - Every 24 Months

Unit: Vista Basic
Manufacturer: B.Braun Melsungen AG

Observe the service manual and the instructions for use. All measured values are to be documented. Accessories used should be included in testing. Make exclusive use of calibrated measuing instruments.

User

Article No.	Unit No.	Year of Procurement

1. Visual Inspection

- ☐ Cleanliness, completeness, damage
- ☐ Pump sealing diaphragm
- ☐ Softkeys, rubber feet
- ☐ Control unit, lock machanism, pump
- ☐ Flow inhibitor
- ☐ Mains cable and mains plug connector
- ☐ MFC connector incl. MFC cable
- ☐ Drop sensor line and plug connector
- ☐ Check voltage values
  100/110/120 V = T 0.135 A
  200/230/240 V = T 0.16A

2. Safety Inspection
as per IEC/EN60601-1

- ☐ Check mains voltage _____ V AC
- ☐ Protective conductor resistance incl. mains cable <0.2 _____ Ω
- ☐ Insulation resistance >> 2 MΩ _____ Ω
- ☐ Earth leakage current ≤ 30 µA _____ µA

3. Accessories Used

- ☐ MFC staff call lead
- ☐ _____
- ☐ _____

4. Functional Inspection

Switch on Unit:
- ☐ Self-test
- ☐ All symbols in LCD
- ☐ Control lamps

Compare with Display:
- ☐ Set Delivery Rate
- ☐ Set volume
- ☐ Set time
- ☐ Press every key once

Battery Test:
- ☐ Switch mains/battery/mains
- ☐ Switch on in battery mode and check self-test

Air Sensor:
(Check with Intrafix Air P Ord. No. 0406 2957 or Vista Pump Set, in temperature range 20°C...25°C)
- ☐ 0.4 ml air bubbles alarm
- ☐ Air value max. 65mV
- ☐ Water value min. 455mV
- ☐ Alarm threshold = 130 mV check and if necessary enter

Drop Sensor:
- ☐ Simulate occlusion alarm with closed roller clamp
- ☐ Simulate free flow (alarm)

Electronic Occlusion Pressure
Check alarm with switchoff pressure
- ☐ Low (5.8 to 14.5 PSI)
- ☐ High (14.5 to 23.2 PSI)

Mechanical Occlusion Pressure:
- ☐ Max 43.5 PSI _____ PSI
- ☐ >26.1 PSI _____ PSI
- ☐ Staff call
- ☐ Pump cover alarm
- ☐ Alarm suppression
- ☐ Flow inhibitor pressure check up to 11.6 PSI no free flow
- ☐ Check delivery accuracy according to service manual

CAUTION: Charge battery!

Applied infusion line
Type: _____ Manufacturer _____
Test Result: Defects found which could endanger patients, users or third parties: ☐ Yes ☐ No
Measures to be taken: ☐ Repair
☐ _____
Special Features / Documentation

Inspection performed by:

Unit handed over to/on:

Date / Signature:

Next deadline:

For your notes:

Procedural Instructions for Inspection 8

1. Visual Inspection

Operating unit, lock mechanism, pump cover, seal membrane, flow inhibitor. Door lock: easy opening and closing, correct top and bottom locking.

Pump cover must automatically open when the unit door is opened.

2. Electrical Safety Inspection as per IEC/EN60 601- 1

Protective Conductor Resistance

Protective conductor resistance < 0.2 Ω incl. mains lead.

Measurement points:

- Potential equalization bolt
- Bolt for door lock
- Unit housing:

  a) If the unit is not sealed countersunk screw at the rear of the unit.

  b) If the unit is sealed, remove lacquer from one of the holes in the foot stands.

Note

Do not use the foot stand assembly screws as alternative measurement points.

Document the largest value.

Insulation Resistance

Insulation resistance >> 2 MΩ

Measurement with 500 V between shorted mains connectors and potential equalization bolt.

Earth Leakage Current

Earth leakage current ≤ 30 µA incl. mains cable.

Measurement under standard conditions at the protective conductor of the mains cable. Two measurements (one with changed poles).

Document the largest value.

Procedural Instructions for Inspection

3. Functional Inspection

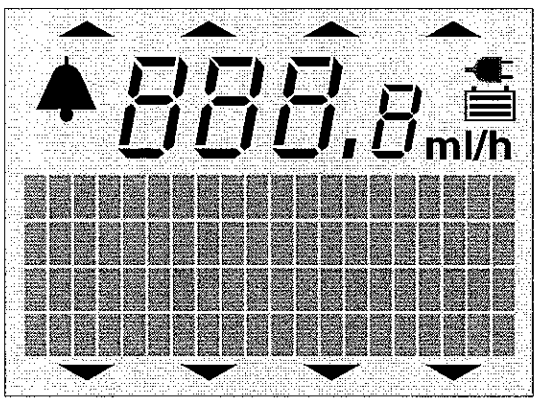

Fig.: 8 - 1

Switch- on Test

Switch-on test keypad and display: check correct procedure. Alarm tone, display: rate 000.0, VOL, TIME etc., display of all pixel, contrast, display light, alarm and operating LED.

Battery Test

Switch mains/battery/mains: Interrupt mains supply twice in intervals of 1 second. Pay attention to the switch-over in the display. The unit must not switch to malfunction.

Note

Running time minimum 30 minutes after charging of 16 hours.

Air Sensor

Set rate to 400 ml/h.

Then inject 0.4 ml air bubble (inject piece). An alarm must be activated.

Drop Sensor

Set rate to 400 ml/h.

- Simulate occlusion: Clamp infusion line in front of the pump to prevent any drops. Alarm in less than 5 sec.
- Simulate free flow: Press the bottom part of the drop chamber together, to generate a jet. Immediate alarm.

Staff Call

- Connect MFC test plug
- Generate an alarm (e.g. open pump cover during operation), red LED is on in the test plug
- If "dynamic" is set, 1 sec.
- If "static" is set, until the alarm is acknowledged

Alarm Suppression

Press the alarm key. The current alarm is suppressed for 2 minutes.

4. Pump Unit Inspection

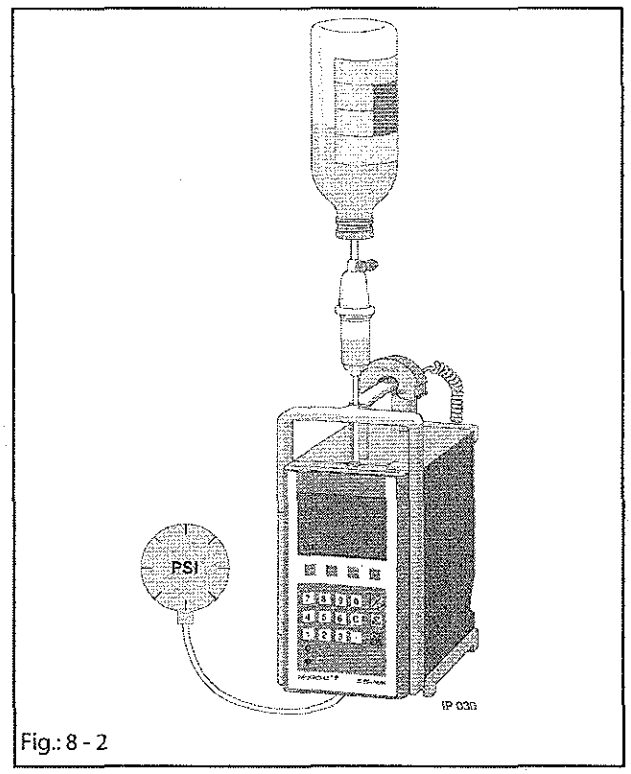

Fig.: 8 - 2

General

- Roomtemperature 20 - 2 8° C
- Use infusion line Intrafix AIR P (PVC) or Vista Pump Set only once.
- Connect an electronic pressure meter to the outside of the pump and position it to approx. medium height of the Vista basic
- Measurement range: 50 PSI

The results differ according to different measurement procedures. With electronic measurement devices the values may be approx. 1.45 PSI higher than indicated.

Electronic Occlusion Pressure (Occlusion Sensor)

Switch off drop control.

Set 600 ml/h and deliver in an opensystem for one minute.

Close the system and build-up pressure against a manometer with 100 ml/h

Occlusion sensor threshold low. . . . . 5.8 to 14.5 PSI

Occlusion sensor threshold high . . . . . 14.5 to 23.2 PSI

Note

The pressure threshold can be changed in the service program (not recomended).
Default setting:
- low pressure: 8.7 PSI
- high pressure:17.4 PSI
Tolerance range:
- set value: ± 4.35 PSI

Mechanical Occlusion Pressure

- Set occlusion sensor threshold to mechanical (test plug).
- Switch off drop control.
- Enter VTBD 1000ml
- Enter rate of 1000 ml/hr
- Build up pressure with 600 ml/hr. Then change rate and measure with 100ml/hr.
- Read 90 seconds after start of delivery:

Measurement upper pressure value (< 43.5 PSI)
Measurement lower pressure value (> 26.1 PSI)

Measured values (see "Technical Safety Inspection TSI" pg. 7-1.

After the measurement inspection the mechanical setting must be switched off! The electronic occlusion pressure is not automat-

automatically activated again when the service plug has been disconnected.

Mechanical Pressure Setting

Check pump pressure. If the deviation is max. ± 4.35 PSI from set range, the pump can be calibrated.

Perform pressure measurement. Calibrate the pressure range at the set screw with an Allen key 2.5 mm. to the upper pressure value of 34.8 PSI.

After the measurement inspection the mechanical setting must be switched off! The electronic occlusion pressure is not automatically activated again when the service plug has been disconnected.

Flow Inhibitor

Switch to stop at high pressures. Then open unit door. The pressure must stay above 11.6 PSI.

Delivery Accuracy

Temperature 22° C

Rate > 1 ml/h

Typically ± 5% at a measurement of more than 8 hours.

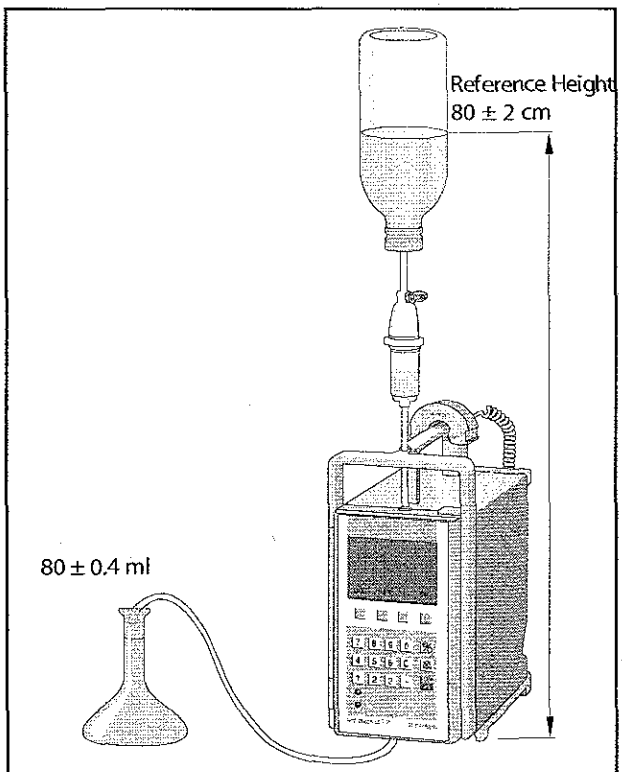

Fig.: 8 - 3

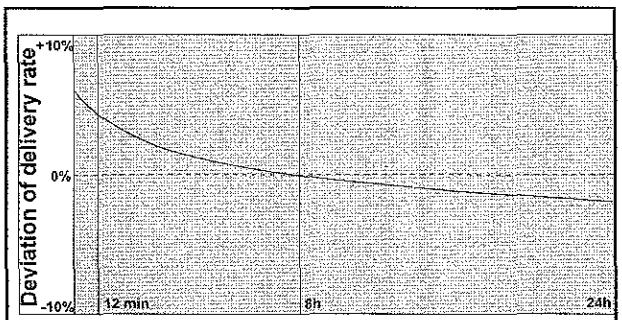

Fig.: 8 - 4 Graph

Determination of Delivery Rate

Alternative procedure (12 minutes short measurement)

Temperature 20 - 28° C

Measurement Equipment:

- 500 ml glass bottle, vented
- Intrafix AIR P (PVC) or Vista Pump Set, drop chamber filled 2/3
- Graduated cylinder 25 ml, accuracy ± 0.4 ml, or collection device and electronic scale (calibrated).
- Infusion solution NaCl or distilled water .

Procedure:

- Use a new infusion line for every measurement.
- Check the system for narrow sections or kinks.
- Delivery rate 125 ml/h.
- Delivery Volume 30 ml
- Press Start to run the pump for 1 minute.
- Press Stop.
- Insert the outlet cannula in the graduated cylinder or zero scale.
- Measurement rate: 125 ml
- Measured volume: 25 ml
- Simultaneously start stop watch and Vista basic.
- Stop when the 25 ml mark on the graduated cylinder or 25g on the scale is reached and read time.
- As shown in the graph the delivery behaviour slightly changes over the infusion time. Consequently the tolerances must be in the upper range when the delivery accuracy (± 5% over 8 hours) is checked with a short measurement over 12 minutes.
- Expected rate deviation due to the short time method:
  Software IFVA: +2.5%
  tolerance range -2.5% to +7.5% of the set rate.
  (11 min. 9.8 sec. to 12 min. 18 sec.)

Measurement Time		Deviation %	Rate ml/h
12 min	37.9 sec	-5	118.75
12 min	30.0 sec	-4	120.00
12 min	22.3 sec	-3	121.25
12 min	18.0 sec	-2.5	
12 min	14.7 sec	-2	122.50
12 min	7.3 sec	-1	123.75
12 min	0.0 sec	0	125.00
11 min	52.9 sec	+1	126.25
11 min	45.9 sec	+2	127.50
11 min	39.0 sec	+3	128.25
11 min	32.3 sec	+4	130.00
11 min	25.7 sec	+5	131.25
11 min	19.7 sec	+6	132.50
11 min	12.9 sec	+7	133.75
11 min	9.8 sec	+7.5	
11 min	6.7 sec	+8	135.00
11 min	0.6 sec	+9	136.25
10 min	54.5 sec	+10	137.50
10 min	48.5 sec	+11	138.75
10 min	42.9 sec	+12	140.00
10 min	26.1	+15	143.75

Table 8 - 1 Measurement Examples

The inspection and calibration - if required - must be performed with the infusion line Vista Pump Set!

Note

Ensure the Vista basic pump is set for the tubing type you are using.

Alternative Measurement Procedure

Inspection of the delivery rate with a weight measurement. Avoid errors due to evaporation!

Measurement Equipment:

- Scales

Accuracy 0.1 g ..... 12 min

Delivery Rate Determination:

- Set the delivery rate to 125 ml/h.
- The run-in time is 1 - 2 minutes.
- Insert the outlet cannula in container and simultaneously start stop watch and Vista basic.
- After the time has expired stop Vista basic and stop watch.
- Immediately determine the delivery rate.

Test Equipment and Special Tools

9

Test Equipment and Special Tools

For Repair / for Technical Safety Inspection (TSI)

	Order No.
Pin punch 1.8 mm x 160 mm (for hinge pin/disassembly of the pump cover)	0770 1446
Pin punch 6 mm x 125 mm (for hinge pin/assembly of the pump cover)	0770 1454
Special socket spanner M18 (for disassembly of the recessed plug)	0770 1497
MFC service plug	3450 1215
Template 2.2 mm	0770 5034
Calibration device	0770 501A
Screw driver Torx T6	
Screw driver Torx T10	

Test Equipment and Special Tools

For your notes:

Spare Parts List 10

Unit Elements

Designation	Ord. No.
Mains Fuses	
Fuse T 0.315 A for 100 / 110 / 120 V (10 pcs.)	3477 0534
Fuse holder	3450 0979
Battery	
Battery incl. connector plug 1.2 Ah / 7.2 V and holder	3450 2556
Door Lock	
Door lock complete with push button	3450 5601
Spring holder for door lock	3450 5440
Mounting for door lock	3477 2790
Pump Cover	
Pump cover with lock	3450 1916
Blind plug 7.1 mm (10 pcs.)	3477 3207
Torsion spring in lever/pump cover (5 pcs.)	3477 3363
Torsion spring for pump cover (5 pcs.)	3477 3355
Lever (pump cover)	3477 4092
Hinge pin for pump cover	3477 3967
Hinge pin for pump cover lever	3450 5725
Pump Housing	
Pump housing, (cpl.)	3450 3390
Housing	
Housing Labelling	3452 0643
Foot stand complete with rubber feet	3450 5415
Rubber feet (20 pcs.)	3477 3096
Unit handle with O-rings and PT screws	3450 3450
Power cord fixation	3452 0651

Designation	Ord. No.
Controller Board	
Distance sleeve	3450 3366
Loudspeaker	3450 8848
Controller board with loudspeaker, volume control and history function, raw material no. 3810 8003	3450 8740
Rear Panel	
Rear panel with screws (M3) and seal	3450 1860
Cover for optical interface	3477 3164
Strip seal for rear panel	3477 3142
MFC connector board	3450 3374
Potential equalization bolt	3477 0550
fm recessed plug (3 pin)	3477 3177
Screw 30x8 for fm recessed plug (20 pcs.)	3477 3185
U Washer 3.2 (20 pcs.)	3477 3193
Mains module 100/110/120 V	3450 1894
Drop sensor socket incl. cable and plug	3450 1878
Front Panel	
Front panel without clamp lever and torsion spring	3450 2092
Circular seal 571 mm / 45 mm	3477 3126
Tamper-proof caps 10 mm (50 pcs.)	3477 3134
Pump housing, cpl.	3450 3390
Cover Ø 6.4	3450 3412
Clamp lever with torsion spring and pin 4x20	3450 3420
Torsion spring	3450 3439
Reed sensor	3450 1754
Clamp Lever	3719 9389

10 Spare Parts List

Designation	Ord. No.
Pump Unit	
Finger pump (without motor) including pump, pump cover, seal membrane and occlusion sensor board	3452 0600
Finger pump (without motor and board) incl. pump, pump cover, and seal membrane	3452 0597
Motor with pinion for finger pump	3450 1924
Occlusion Sensor	
Occlusion sensor (cpl.)	3452 0619
Air Sensor	
Air sensor incl. connector	3450 193A
Operating Unit	
Membrane keypad with support plate and seal	3452 0635
LCD module	3450 1819
Flex cable, preformed	3450 8830
Frame incl. pressure spring and magnet	3450 1835
Flexible cable 42 mm (5 pcs.)	3477 3347
Hinge unit	3450 5571
Hinge pin (3 mm)	3450 5580
Magnet	3450 5849

Designation	Ord. No.
Barcode Label	
Barcode label (see "Order Form" pg. A - 2)	3450 9070
Frame with Seal	
Frame with seal plate	3450 1770
Colors	
Touch-up pen RAL 9001 (white)	3450 6977
Touch-up pen RAL 7032 (grey)	3450 6985
Miscellaneous	
Assembly screw for display board PT 2.5x14 (10 pcs.)	3477 3100
Screw PT 3x10 Torx (self-forming)	3450 0960
Rubber feet grey (20 pcs.)	3477 3096
Caution label - Roller Clamp	3916 8018
Screw M 6x8 for fm recessed plug (20 pcs.)	3477 3185
U Washer 3.2 (20 pcs.)	3477 3193
Software Update	
MFC interface line	0871 1661

Appendix A

ESD Recommendations

Semiconductors can be destroyed by electrostatic discharge. Especially MOS components can be damaged by interference from electrostatic fields, even without discharge via contact. This type of damage is not immediately recognizable. Unit malfunctions can even occur after a longer period of operation.

Every workstation must be equipped according to the recommendations with the necessary static protective measures, if ESD components or boards are handled.

Workstation

Each workstation must be equipped with a conductive table surface. The conductive surface, the soldering iron or the soldering stations must be grounded via protective resistors.

Chairs must be of antistatic design. The floor or floor mats should be of electrically conductive material.

Personnel must wear conductive wristbands which are connected to a central ground potential via protective resistors, e.g. the ground contact of a wall outlet. Furthermore it is recommended that personnel wear cotton clothing and electrically conductive shoes to prevent electrostatic charge.

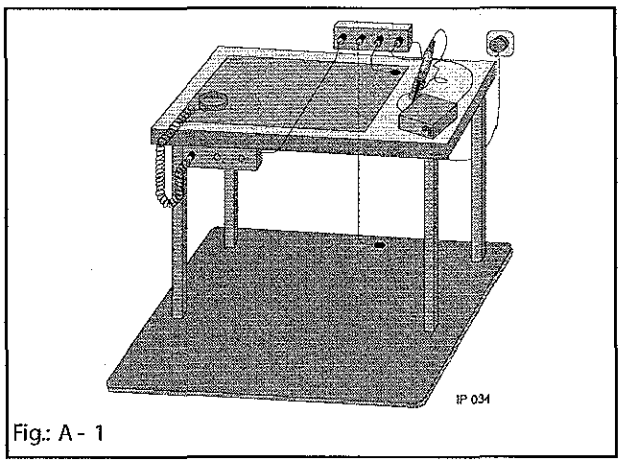

Fig.: A - 1

Appendix

Revision Service- Documentation

Current Information

Order Form

FAX

(Master)

B. Braun Melsungen AG

attn. Mr. Lohr
MT-PR-DE08C
P.O. Box 1120
34 209 Melsungen

email: ingo.lohr@ bbraun.com

Fax-No: (05661) 75 - 38 09

Hospital: .....
Ward: .....
Street: .....
zip code / town: .....
Person responsible: .....
Tel.: .....

Order Barcode Label Order No. 3450 9070 for Vista basic (DIANET-Type-Number **00203**)

We herewith order the barcode label / type plate with the following serial numbers (the serial number is indicated on the type plate of the pump).

Serial Number	Serial Number	Serial Number	Serial Number

We gaurantee that we will fix the barcode label / type plates to the corresponding pumps in accordance with the Service Manual and its enclosures and will carry out the necessary test steps. Barcode labels or type plates that are not required will be destroyed.

Date: _____ Signature: _____

Appendix

For your notes:

Corporate Headquarters
B. Braun Medical Inc.
824 Twelfth Avenue
Bethlehem, PA 18018

Vista® basic 950971 Rev A (05/04)